PHASE CONTROL DIODE MODULES

# M2D-160, M2DC-160, M2DA-160

- $V_{RRM}$ = **2400 - 3200 V**
- $I_{F(AV)}$ = **180 A** ($T_C$ = 85 °C)
- $I_{FSM}$ = **5,5 kA** ($T_{Vj}$ = 125 °C)

- Heat transfer through AlN ceramic isolated metal baseplate
- Presspack construction
- High reliability at thermal cycles ($10^5$ at $\Delta T_C$ = 70 ºC)
- Case width 34 mm

## MAXIMUM RATED VALUES

| Parameter and conditions | Symbol | Values | | | Units |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| Repetitive peak reverse voltage, $T_{Vj}$ = - 60 °C…+ 125 °C | $V_{RRM}$ | 2400 | - | 3200 | V |
| Non- repetitive peak reverse voltage, $T_{Vj}$ = - 60 °C…+ 125 °C | $V_{RSM}$ | 2500 | - | 3300 | |
| Repetitive peak reverse current, $T_{Vj}$ = 125 °C, $V_R = V_{RRM}$ | $I_{RRM}$ | - | - | 40 | mA |
| Max. average forward current, f = 50 Hz, $T_C$ = 85 °C | $I_{F(AV)}$ | - | - | 180 | A |
| RMS forward current | $I_{FRMS}$ | - | - | 280 | |
| Surge forward current, $V_R$ = 0, $T_{Vj}$ = 125 °C, $t_p$ = 10 ms | $I_{FSM}$ | - | - | 5,5 | kA |
| Safety factor | $I^2t$ | - | - | 150 | $kA^2s$ |
| Operation junction temperature range | $T_{Vj}$ | - 60 | - | + 125 | °C |
| Storage temperature range | $T_{stg}$ | - 60 | - | + 50 | |

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| | | | | | |
|---|---|---|---|---|---|
| **ELECTRICAL CHARACTERISTICS** | | | | | |
| Maximum peak forward voltage, $I_F$ = 500 A, $T_{Vj}$ = 25 °C | $V_{FM}$ | - | - | 1,25 | V |
| Threshold voltage, $T_{Vj}$ = 125 °C, $I_F$ = 200 - 800 A | $V_{(TO)}$ | - | - | 0,85 | |
| Slope resistance, $T_{Vj}$ = 125 °C, $I_F$ = 200 - 800 A | $r_T$ | - | - | 0,85 | mΩ |
| Recovery charge, $di_F/dt$ = - 5 A/µs, $T_{Vj}$ = 125 °C, $I_F$ = 160 A, $V_R$ ≥ 100 V | $Q_{rr}$ | - | - | 1000 | µAs |
| Insulation test voltage (RMS), f = 50 Hz, t = 1sec/1min | $V_{isol}$ | - | - | 3600/3000 | V |
| **THERMAL PARAMETERS** | | | | | |
| Thermal resistance junction to case, per diode<br>per module | $R_{thjc}$ | - | - | 0,18<br>0,09 | °C/W |
| Thermal resistance case to heatsink, per diode<br>per module | $R_{thch}$ | - | - | 0,10<br>0,05 | |
| **MECHANICAL PARAMETERS** | | | | | |
| Weight | w | - | 0,5 | - | kg |
| Terminal connection torque | $M_t$ | 4 | - | 6 | Nm |
| Heatsink mounting torque | $M_s$ | 4 | - | 6 | |
| Maximum acceleration (at nominal mounting force) | a | - | - | 50 | $m/s^2$ |

# M2D-160, M2DC-160, M2DA-160

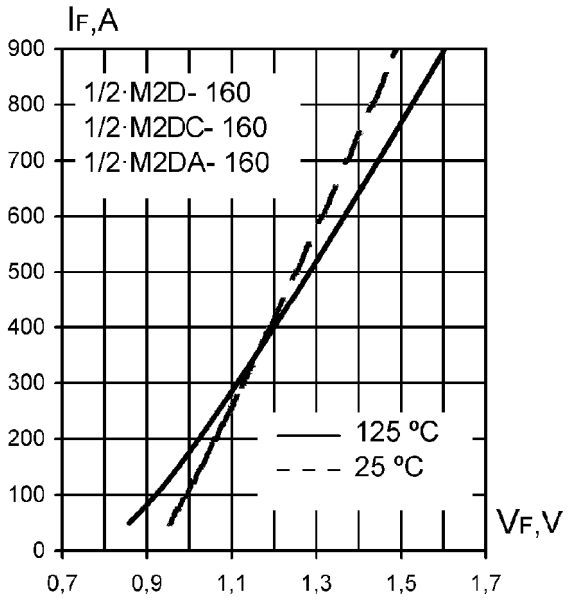


**Fig. 1. Maximum forward characteristics**
(Limit device, 10 ms, half sine)

**forward characteristics model**

$V_F = A + B \cdot I_F + C \cdot \ln(I_F + 1) + D \cdot \sqrt{I_F}$

Valid for $I_F$ = 50 – 900 A

| | $T_{Vj}$ = 125 ºC | $T_{Vj}$ = 25 ºC |
|---|---|---|
| A | 0.711 | 0.896 |
| B | 0.0006755 | 0.0005074 |
| C | 0.02 | -0.0004827 |
| D | 0.004938 | 0.004717 |

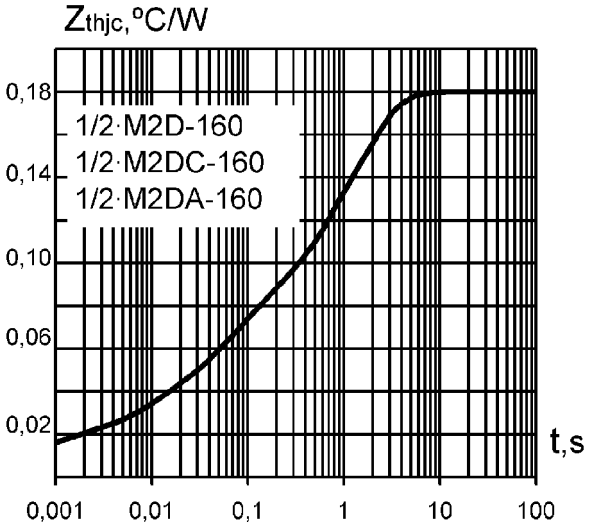


**Fig. 2. Transient thermal impedance junction to case ( DC )**

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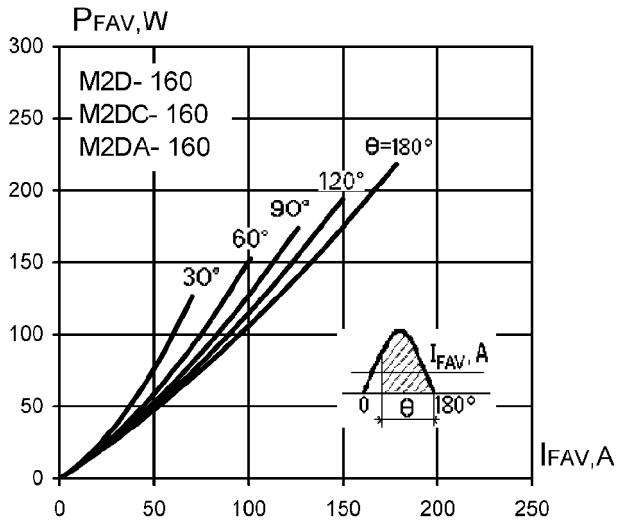


**Fig. 3. Power loss vs. forward current**
(sine)

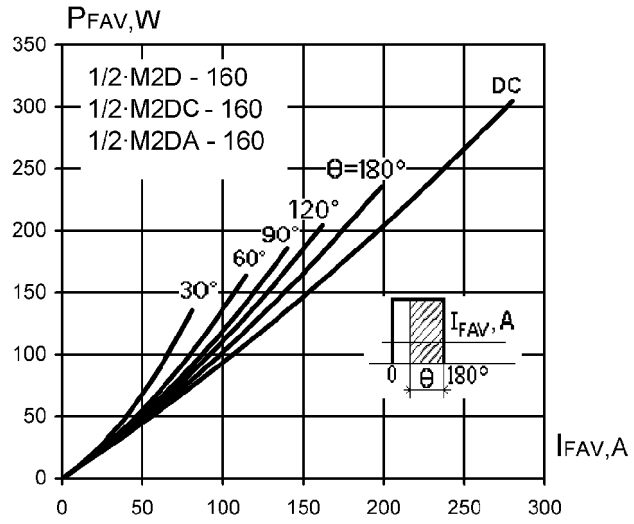


**Fig. 4. Power loss vs. forward current**
(rectangular)

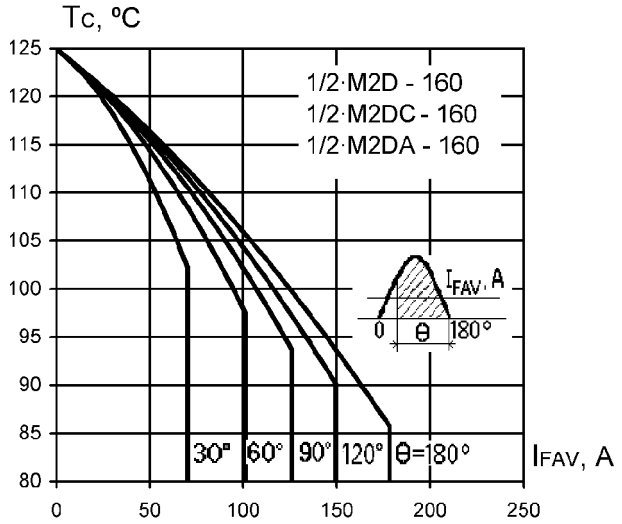


**Fig. 5. Maximum allowable case temperature vs. forward current**
(sine)

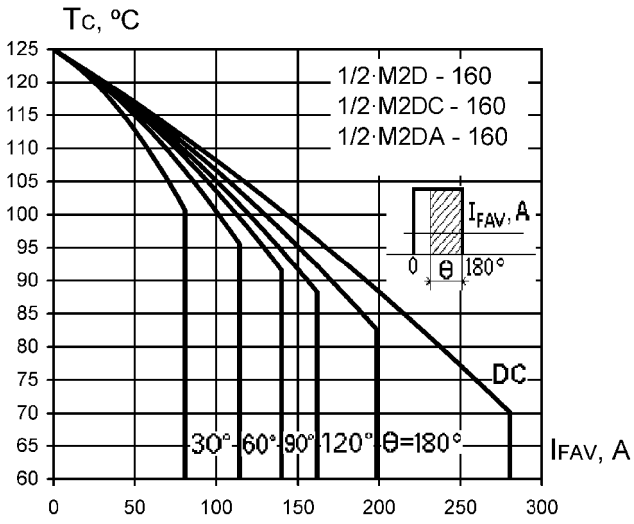


**Fig. 6. Maximum allowable case temperature vs. forward current**
(rectangular)

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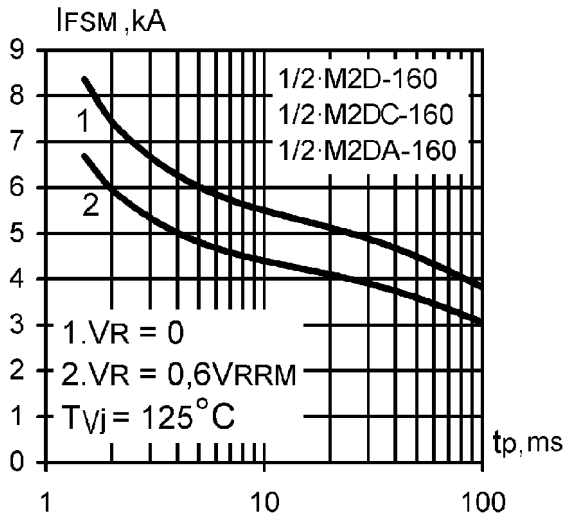


**Fig. 7. Surge current vs. pulse length**
(half-sine)

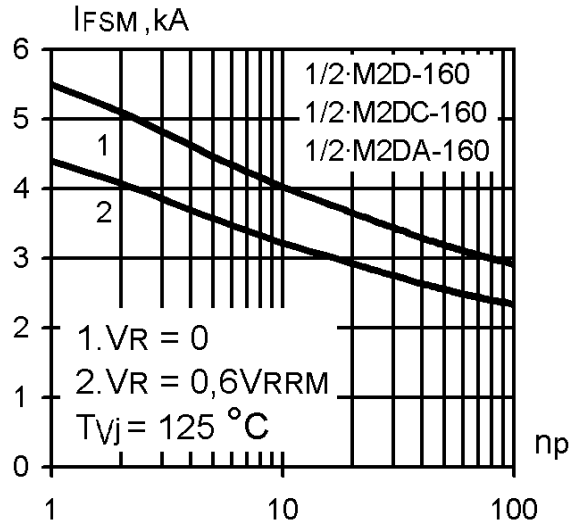


**Fig. 8. Surge current vs. number of pulses**
(half-sine,10 ms, 50 Hz)

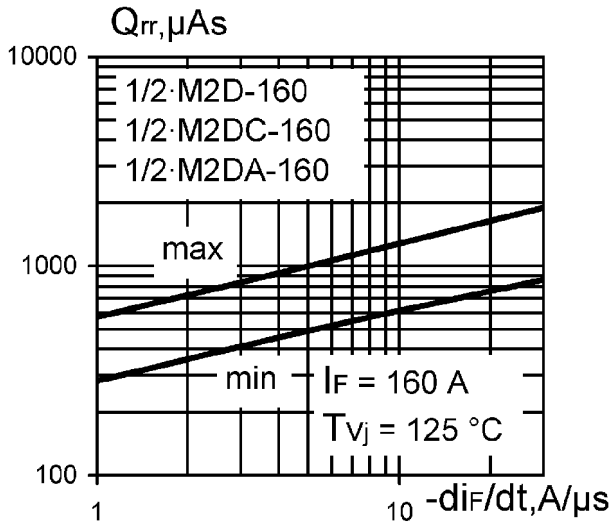


**Fig. 9. Recovery charge vs. decay rate current**

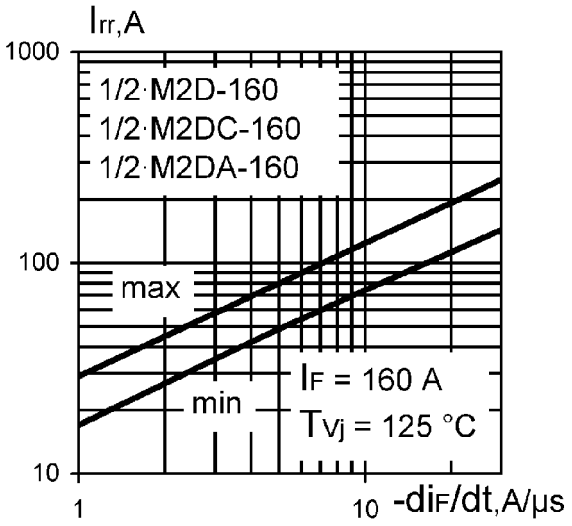


**Fig. 10. Peak reverse recovery current vs. decay rate current**

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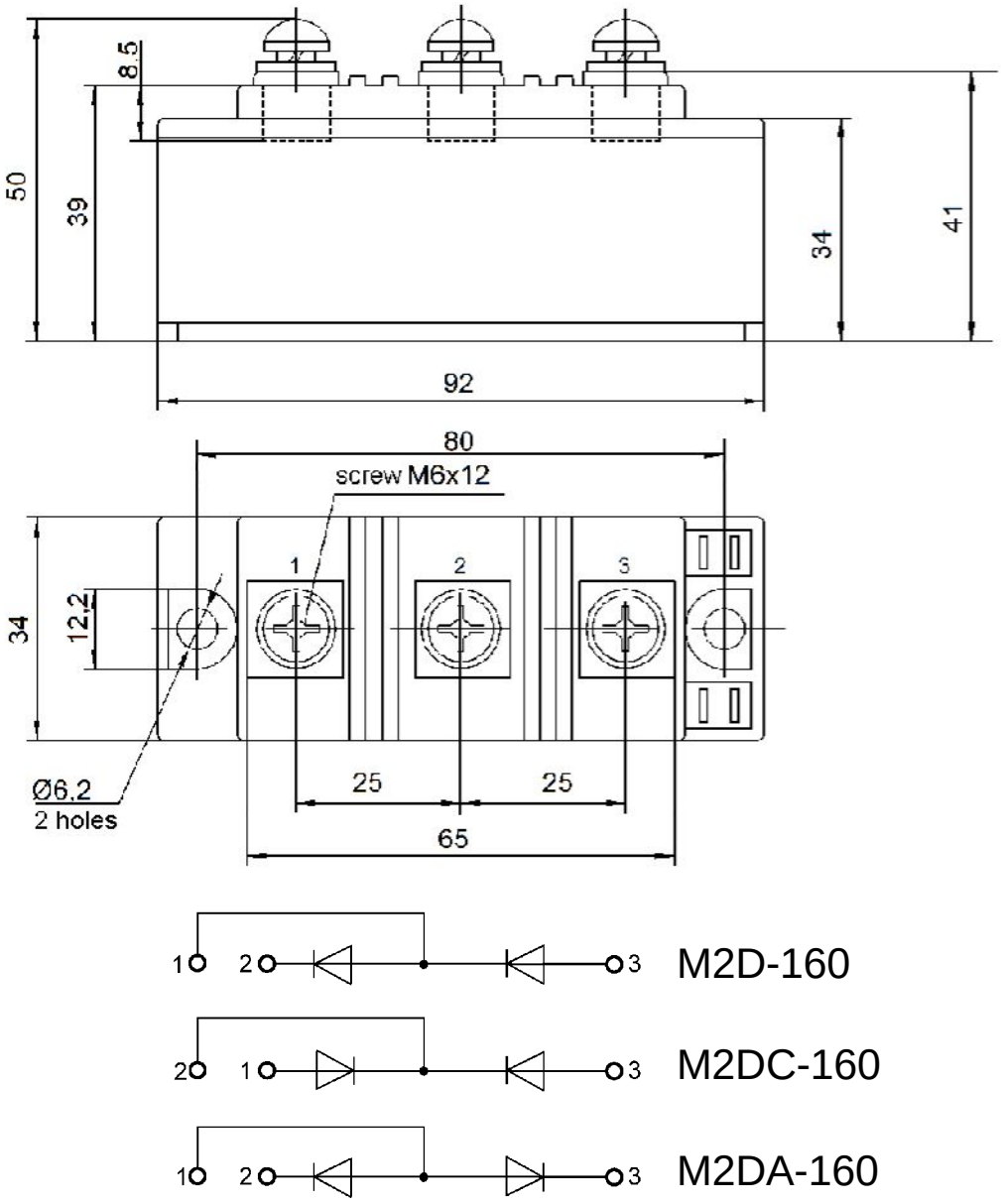


**Fig. 11. Device Outline Drawing**
(dimensions in mm)

**JSC «ELECTROVIPRYAMITEL» reserves the right to change specification without notice.**

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